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| APPLICATION NO.   | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------|------------------|
| 10/620,560  | 07/17/2003  | Ming-Chi Liaw        | MERCK-1923D1        | 9252             |
| 23599   | 7590        | 11/15/2006           | EXAMINER            |                  |
| MILLEN, WHITE, ZELANO & BRANIGAN, P.C.<br>2200 CLARENDON BLVD.<br>SUITE 1400<br>ARLINGTON, VA 22201 |             |                      | OLSEN, ALLAN W      |                  |
|   |             |                      | ART UNIT            | PAPER NUMBER     |
|   |             |                      | 1763                |                  |

DATE MAILED: 11/15/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/620,560

Applicant(s)

LIAW ET AL.

Examiner

Allan Olsen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 23 August 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 13-21 and 24-27 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 13-21 and 24-27 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☒ Certified copies of the priority documents have been received in Application No. 01/151,181.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

**Claims 13, 15, 16, 18-20, 24, 25 are rejected under 35 U.S.C. 102(b) as being anticipated by Ohnishi et al. in EP 0618612A2 (hereinafter, Ohnishi) or, in the alternative, under 35 U.S.C. 103(a) as obvious over Ohnishi.**

Ohnishi teaches removing organic and inorganic sidewall residue after the plasma etching of a substrate through a photoresist mask (figure 7a) by conducting a 5-10 minute cleaning process while maintaining a temperature between 80° and 130° C (column 8, lines 5-13). Ohnishi teaches a cleaning solution comprising H<sub>2</sub>SO<sub>4</sub>, H<sub>2</sub>O<sub>2</sub> and an HF generating compound, for example, HSO<sub>3</sub>F. Ohnishi teaches compositions wherein the volume percentage of HSO<sub>3</sub>F ranges from .005% to 0.75%. Ohnishi discloses a comparative example comprising H<sub>2</sub>SO<sub>4</sub>, H<sub>2</sub>O<sub>2</sub> and 1% by volume HF. This rejection is made in the 102/103 alternative for several reasons<sup>1</sup>. Ohnishi does not teach the amount of HF that is produced in the solution. However, in view of the similar results obtained from Ohnishi's and applicant's compositions, it would appear that

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<sup>1</sup> Example of circumstances when an alternative 102/103 rejection is appropriate:

a. When the reference discloses all the limitations of a claim except a property or function, and the examiner cannot determine whether or not the reference inherently possesses properties which anticipate or render obvious the claimed invention but has basis for shifting the burden of proof to applicant as in *In re Fitzgerald*, 619 F.2d 67, 205 USPQ 594 (CCPA 1980). See MPEP § 2112-2112.02.

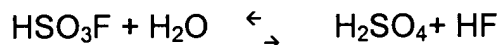
b. When the interpretation of the claims is or may be in dispute, i.e., given one interpretation, a rejection under 35 U.S.C. 102 is appropriate and given another interpretation, a rejection under 35 U.S.C. 103(a) is appropriate.

c. When the ranges disclosed in the reference and claimed by applicant overlap in scope but the reference does not contain a specific example within the claimed range. See the concurring opinion in *Ex parte Lee*, 31 USPQ2d 1105 (Bd. Pat. App. & Inter. 1993). See MPEP § 2131.03.

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Ohnishi's composition is comparable to the claimed composition. This, in part, prompted the rejection to be made in the 102/103 alternative, and as provided for by an analogous situation, "where the Patent Office has reason to believe that a functional limitation asserted to be critical for establishing novelty in the claimed subject matter may, in fact, be an inherent characteristic of the prior art, it possesses the authority to require the applicant to prove that the subject matter shown to be in the prior art does not possess the characteristic relied on".<sup>2</sup>

With respect to the "consisting essentially of" claim language, the examiner notes Ohnishi discloses the following equilibrium:



Therefore, it is inherent that applicant's combination of H<sub>2</sub>SO<sub>4</sub> and HF also contains HSO<sub>3</sub>F. As such, HSO<sub>3</sub>F is an inevitable component of applicant's compositions and the consisting essentially of claim language could in no way be viewed as exclusive of HSO<sub>3</sub>F.

Regarding Ohnishi's comparative example wherein 1 % hydrofluoric acid is added to a 5:1 mixture of H<sub>2</sub>SO<sub>4</sub> and H<sub>2</sub>O<sub>2</sub>. This corresponds to an H<sub>2</sub>SO<sub>4</sub>: HF (w/w) ratio of 300: 1.<sup>3</sup>

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<sup>2</sup> In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433-34 (CCPA 1977) at 1254-55, 195 USPQ at 433 (quoting from In re Swinehart, 58 CCPA 1027, 439 F.2d 210, 169 USPQ 226 (1971)).

<sup>3</sup> Calculation based on volume/volume relationships between solutions of standard concentration (as is customary when all components are liquid).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

**Claims 14, 17, 21, and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohnishi.**

The above noted teachings of Ohnishi are herein relied upon.

Ohnishi does not teach:

1. the type of photoresist resist as being one of a g-line, i-line, Deep-UV, e-beam or X-ray;
2. removing photoresist while the operation pressure is maintained at 1 atm;
3. an (H<sub>2</sub>SO<sub>4</sub> + HF): H<sub>2</sub>O<sub>2</sub> ratio of 3:1.

It would have been obvious to one skilled in the art to apply the method of Ohnishi to one of a g-line, i-line, Deep-UV, e-beam or X-ray photoresist because Ohnishi is directed to the removal of a generic photoresist and the types of photoresist recited in claim 14 include the most common types of photoresist that were use at the time of Ohnishi's disclosure.

It would have been obvious to one skilled in the art to carry out the method of Ohnishi while maintaining a pressure of 1 atm because when a reference is completely silent on a parameter such as pressure, the skilled artisan would assume that the ambient pressure is used. If Ohnishi intended the method to be carried out at anything other than 1 atm the skilled artisan would expect that this to be disclosed. In the absence of such a disclosure it would be obvious to operate at a pressure of 1 atm.

It would have been obvious to one skilled in the art to optimize the process with regard to the ratio of the components in the cleaning solution because Ohnishi teaches that a composition ratio is a cause-effective variable.

"Normally, it is to be expected that a change in temperature, or in concentration, or in both, would be an unpatentable modification. Under some circumstances, however, changes such as these may impart patentability to a process if the particular ranges claimed produce a new and unexpected result which is different in kind and not merely degree from the results of the prior art... such ranges are termed "critical ranges and the applicant has the burden of proving such criticality... More particularly, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation."<sup>4</sup>

Additionally, concentration limitations are obvious absent a showing of criticality.<sup>5</sup>

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<sup>4</sup> *In re Aller* 105 USPQ 233, 255 (CCPA 1955). See also *In re Waite* 77 USPQ 586 (CCPA 1948); *In re Scherl* 70 USPQ 204 (CCPA 1946); *In re Irmischer* 66 USPQ 314 (CCPA 1945); *In re Norman* 66 USPQ 308 (CCPA 1945); *In re Swenson* 56 USPQ 372 (CCPA 1942); *In re Sola* 25 USPQ 433 (CCPA 1935); *In re Dreyfus* 24 USPQ 52 (CCPA 1934).

<sup>5</sup> *Akzo v. E.I. du Pont de Nemours* 1 USPQ 2d 1704 (Fed. Cir. 1987)

### ***Response to Arguments***

Applicant's arguments filed August 23, 2006 have been fully considered but they are not persuasive.

With respect to Ohnishi's comparative example, applicant argues:

"it cannot be determined if the ratio taught by Ohnishi is by weight or by volume. There is simply not enough meaningful information provided for one skilled in the art to arrive at the present invention. The teaching is ambiguous at best.

In response, the examiner contends that the skilled artisan would consider the 1% concentration and the 5:1 ratio taught by Ohnishi to reflect volume/volume relationships, because the components being combined are all liquids and it is customary to use volume/volume relationships when all components are liquid. Most notably however, the claimed  $\text{H}_2\text{SO}_4$ : HF ratio is met by the teaching of Ohnishi regardless of whether the skilled artisan applies a (v/v), (w/v) or (w/w) relationship to the concentration teachings of Ohnishi.

In the first Office action the examiner stated:

"Ohnishi does not explicitly teach the amount of HF that is produced in solutions. However, the examiner believes that within the  $\text{HSO}_3\text{F}$  concentration range taught by Ohnishi, the claimed weight ratio between sulfuric acid and hydrofluoric acid would inherently be present."

Applicant replies:

"It is not enough to "believe", the rejection must be supported by more than speculation or belief."

The examiner notes *In re Best*.<sup>supra</sup>

Applicant again argues that Ohnishi teaches away from the use of HF. Applicant notes that Ohnishi adds fluorosulfuric acid  $\text{HSO}_3\text{F}$  or  $\text{SO}_2\text{F}_2$  to sulfuric acid in order to

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generate HF by reaction with water molecules. Quoting Ohnishi, applicant notes that  $\text{HSO}_3\text{F}$  and  $\text{SO}_2\text{F}_2$  are used "instead of using hydrofluoric acid." Applicant's relies on this too support their position that Ohnishi teaches eliminating the use of HF. Applicant questions, "[h]ow can this lead one to use HF in Ohnishi's art?"

The examiner notes that Ohnishi's express purpose in providing  $\text{HSO}_3\text{F}$  and  $\text{SO}_2\text{F}_2$  is to provide a source of HF. Rather than seeing Ohnishi as teaching away from the use of HF, the examiner considers Ohnishi to teach an alternative means by which HF can be supplied to the composition.

With respect to, "[h]ow can this lead one to use HF in Ohnishi's art?", the examiner again points out that using HF is an inherent and intentional aspect of Ohnishi's method.

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of



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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Allan Olsen whose telephone number is 571-272-1441.

The examiner can normally be reached on M, W and F: 1-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on 571-272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'Allan Olsen', with a stylized flourish at the end.

Allan Olsen  
Primary Examiner  
Art Unit 1763